## REMARKS

Applicants have studied the Office Action dated March 26, 2004. It is submitted that the application, as amended, is in condition for allowance. Claims 1, 3-13, 15, 17, and 19-25 are pending. Claims 1, 4, 10, 11, 13, and 15 have been amended. Claims 2, 14, 16, and 18 have been cancelled. Reconsideration and allowance of the pending claims in view of the above amendments and the following remarks is respectfully requested.

In the Office Action, the Examiner:

(3) rejected claims 1, 3, 5-9, 14, 15, 17, and 19-26 under 35 U.S.C .§ 102(b) as being anticipated by Yoshitani et al. (U.S. Patent No. 5,975,098);

(7) rejected claims 2, 4, 11, 16, and 18 under 35 U.S.C. § 103(a) as being unpatentable over Yoshitani et al. (U.S. Patent No. 5,975,098);

(8) rejected claim 10 under 35 U.S.C. § 103(a) as being unpatentable over Yoshitani et al. (U.S. Patent No. 5,975,098) in view of Thrasher et al. (U.S. Patent No. 5,745,946);

(9) rejected claim 13 under 35 U.S.C. § 103(a) as being unpatentable over Yoshitani et al. (U.S. Patent No. 5,975,098) in view of Busnaina (US2001/0013355); and

(10) rejected claim 12 under 35 U.S.C. § 103(a) as being unpatentable over Yoshitani et al. (U.S. Patent No. 5,975,098) in view Thrasher et al. (U.S. Patent No. 5,745,946), and further in view of Busnaina (US2001/0013355).

### The Specification

Entrance of the above-indicated amendment to the specification is hereby requested. The application, as originally filed, had two instances where two separate elements in FIG. 1 were identified with the same reference numbers. The amendment, listed above, to the paragraph beginning on line 9 on page 7 of the instant application corrects this error.

### The Drawings

Entrance of the above-indicated amendment to FIG. 1 is hereby requested. The application, as originally filed, had two instances where two separate elements in FIG. 1

were identified with the same reference numbers. The amendment to FIG. 1, included with this Amendment, corrects this error.

(3) Rejection under 35 U.S.C. § 102(b) Yoshitani et al.

As noted above, the Examiner rejected claims 1, 3, 5-9, 14, 15, 17, and 19-26 under 35 U.S.C .§ 102(b) as being anticipated by Yoshitani et al. (U.S. Patent No. 5,975,098). Independent claims 1, 15, and 26 have been amended to distinguish and to more clearly define the present invention over Yoshitani et al. Support for the changes is found in cancelled claims 2 and 16 and from page 6, line 24, to page 7, line 6 in the specification as originally filed. No new matter has been added.

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful. Independent claim 1 recites, *inter alia*:

> ...insonifying the liquid, with a focusing acoustic transducer, as it is being sprayed, producing longitudinal and shear waves which propagate into the object itself with an acoustic power divided by an area (acoustic power/area), which is a function of an amount of electric power applied to the focusing acoustic transducer at a given frequency to result in the liquid with an insonified power density of at least 5 kW / $cm^2$ without substantial cavitation occurring on a surface of an object being cleaned. (emphasis added).

The Yoshitani et al. reference discloses a substrate rinsing apparatus of a non-contact type. Additionally, Yoshitani et al. discloses an ultrasonic rinsing nozzle that ejects ultrasonic rinsing liquid as a **curtain** through a slit. Col. 16 lines 36-44, and FIGs. 15 and 17. As noted by the Examiner in paragraph 7 of the above-identified Office action, **Yoshitani et al. do not disclose a power density of at least 5 kW/$cm^2$, as recited in amended claim 1 of the instant application.**

In Yoshitani et al., the acoustic power/area is small compared to that in the present invention. From the shape of the cavity 13—elongated (see FIG. 15, item 13 of Yoshitani et al.)—in the nozzle 10 (see FIG. 2A, of Yoshitani et al.) it is impossible for a significant amount of acoustic energy to be transmitted through the stream "F" (see FIG. 21, of Yoshitani et al.) ejected from the nozzle, due to the flat contour of the cavity 13.

Therefore, little focusing occurs and most of the acoustic energy will be reflected from the tapered walls (see FIG. 2A, of Yoshitani et al.) in the nozzle 10. As a result, it is essentially impossible to obtain a power density of at least 5kW/cm$^2$ from a flat transducer 13 as opposed to the focusing acoustic transducer of the present invention, as shown in FIGs. 1, 4, 5, and 6 and described on page 7, of the instant application.

The Examiner cites 35 U.S.C. § 102(b) and a proper rejection requires that a single reference teach (i.e., identically describe) each and every element of the rejected claims as being anticipated by Yoshitani et al.[1] By virtue of this amendment, independent claim 15 has been amended to contain the same limitations of independent claim 1. Because the elements in independent claims 1, 15, and 26 (at least "a focusing acoustic transducer" and "a power density of at least 5 kW / cm$^2$") of the instant application is not taught or disclosed by Yoshitani et al., the apparatus of Yoshitani et al. does not anticipate the present invention. The dependent claims are believed to be patentable as well because they all are ultimately dependent on either claim 1 or claim 15. Accordingly, the present invention distinguishes over Yoshitani et al. for at least this reason. The Applicants respectfully submitted that the Examiner's rejection under 35 U.S.C. § 102(b) has been overcome.

(7) Rejection under 35 U.S.C. §103(a) Yoshitani et al.

As noted above, the Examiner rejected claims 2, 4, 11, 16, and 18 under 35 U.S.C. § 103(a) as being unpatentable over Yoshitani et al. (U.S. Patent No. 5,975,098).

Dependent claims 2 and 16 have been cancelled and their limitations added to independent claims 1 and 15, respectively, to distinguish and to more clearly define the present invention over Yoshitani et al. No new matter has been added.

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[1] See MPEP §2131 (Emphasis Added) "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim."

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful. Independent claim 1 recites, *inter alia*:

> ...insonifying the liquid, with a focusing acoustic transducer, as it is being sprayed, producing longitudinal and shear waves which propagate into the object itself with an acoustic power divided by an area (acoustic power/area), which is a function of an amount of electric power applied to the focusing acoustic transducer at a given frequency to result in the liquid with an insonified power density of at least 5 kW / $cm^2$ without substantial cavitation occurring on a surface of an object being cleaned. (emphasis added).

The Yoshitani et al. reference discloses a substrate rinsing apparatus of a non-contact type. Additionally, Yoshitani et al. disclose an ultrasonic rinsing nozzle that ejects ultrasonic rinsing liquid as a curtain through a slit. Col. 16 lines 36-44, and FIGs. 15 and 17 of Yoshitani et al. As noted by the Examiner in paragraph 7 of the above-identified Office action, **Yoshitani et al. do not disclose a power density of at least 5 kW/cm2, as recited in amended claim 1 of the instant application.**

In Yoshitani et al., the acoustic power/area is small compared to that in the present invention. From the shape of the cavity 13—elongated (see FIG. 15, item 13 of Yoshitani et al.)—in the nozzle 10 (see FIG. 2A of Yoshitani et al.) it is impossible for a significant amount of acoustic energy to be transmitted through the stream "F" (see FIG. 21 of Yoshitani et al.) ejected from the nozzle, due to the flat contour of the cavity 13. Therefore, little focusing occurs and most of the acoustic energy will be reflected from the tapered walls (see FIG. 2A of Yoshitani et al.) in the nozzle 10. As a result, it is essentially impossible to obtain a power density of at least 5kW/$cm^2$ from a flat transducer 13 as opposed to the focusing acoustic transducer of the present invention, as shown in FIGs. 1, 4, 5, and 6 and described in page 7.

It was shown by M. P Drake, Trans. Inst. Met. Fin. (pt 2) 67 (1980) that for an acoustic transducer in water, the acoustic power/area increases exponentially with frequency before cavitation occurs. It is for that reason that the focusing transducer of the present invention is placed within the cavity into which the water enters prior to being ejected by way of the nozzle onto the part to be cleaned. See FIG. 1 of the instant application. In

this manner, as stated on page 6, line 24, through page 7, line 6, of the instant application, cavitation is purposely avoided, while at the same time increasing the power/area to maximize the cleaning capability.

The Federal Circuit has consistently held that when a §103 rejection is based upon a modification of a reference that destroys the intent, purpose or function of the invention disclosed in the reference, such a proposed modification is not proper and the *prima facie* case of obviousness can not be properly made. See In re Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). Here the intent, purpose and function of Yoshitani et al. is the use of an ultrasonic rinsing nozzle 10 with an elongated slot 13 that produces a curtain of liquid "F". Yoshitani et al. are completely silent on a "focusing transducer." The non-focusing transducer cannot meet the intent and purpose of the present invention of "a power density of at least 5 kW/CM$^2$ without substantial cavitation occurring on a surface of an object being cleaned." Not only does the present invention provide such high power insonifing but it also avoids the problems of cavitation. This combination, as suggested by the Examiner, destroys the intent and purpose of Yoshitani's use of non-focusing transducers. Accordingly, the present invention is distinguishable over Yoshitani et al. for this reason as well.

Continuing further, when there is no suggestion or teaching in the prior art for "a power density of at least 5 kW / cm$^2$ without substantial cavitation occurring on a surface of an object being cleaned," the suggestion can not come from the Applicant's own specification. The Federal Circuit has repeatedly warned against using the Applicant's disclosure as a blueprint to reconstruct the claimed invention out of isolated teachings of the prior art. See MPEP §2143 and Grain Processing Corp. v. American Maize-Products, 840 F.2d 902, 907, 5 USPQ2d 1788 1792 (Fed. Cir. 1988) and In re Fitch, 972 F.2d 160, 12 USPQ2d 1780, 1783-84 (Fed. Cir. 1992). The prior art reference Yoshitani et al. does not even suggest, teach nor mention use of a focused acoustic beam which permits high power insonification having a power density of at least 5 kW / cm$^2$ without substantial cavitation occurring on a surface of an object being cleaned.

For the foregoing reasons, independent claims 1 and 15, as amended, distinguish over

Yoshitani et al. Claims 4 and 11 depend from claim 1 and claim 18s depend from claim 15. Since dependent claims contain all the limitations of the independent claims, claims 4, 11, and 18 distinguish over Yoshitani et al. as well, and the Examiner's rejection should be withdrawn.

(8) Rejection under 35 U.S.C. § 103(a) Yoshitani in view of Thrasher et al.

As noted above, the Examiner rejected claim 10 under 35 U.S.C. § 103(a) as being unpatentable over Yoshitani et al. (U.S. Patent No. 5,975,098) in view of Thrasher et al. (U.S. Patent No. 5,745,946).

The Statute expressly requires that obviousness or non-obviousness be determined for the claimed subject matter "as a whole," and the key to proper determination of the differences between the prior art and the present invention is giving full recognition to the invention "as a whole." The Yoshitani et al. reference taken alone or in view of Thrasher et al. simply does not suggest, teach or disclose the patentably distinct limitation of:

> ...insonifying the liquid with a focusing acoustic transducer as it is being sprayed, producing longitudinal and shear waves which propagate into the object itself with an acoustic power divided by an area (acoustic power/area), which is a function of an amount of electric power applied to the focusing acoustic transducer at a given frequency to result in the liquid with an insonified power density of at least 5 kW / $cm^2$ without substantial cavitation occurring on a surface of an object being cleaned. (emphasis added).

The limitations taken "as a whole" in independent claims 1 and 15 are not present in Yoshitani et al. taken alone and/or in view of Thrasher et al.

Very recently, the Federal Circuit again took up the identical question of Obviousness in combining references in the case In re Sang Su Lee, No. 00-1158 (January 18, 2002). In this case, the Board of Patent Appeals rejected all of Applicant's pending claims as obvious under § 103. The Federal Circuit vacated and remanded. Citing two prior art references, the Board stated that a person of ordinary skill in the art would have been motivated to combine the references based on "common knowledge" and "common sense," but it did not present any specific source or evidence in the art that would have

otherwise suggested the combination. Here the Examiner on page 4 is citing "*it would have been obvious to an artisan at the time the invention was made to use a belt conveyor for it's conventional purpose in the method of Yoshitani*" without more.[2] The Federal Circuit held that the Board's rejection of a need for any specific hint or suggestion in the art to combine the references was both legal error and arbitrary agency action subject to being set aside by the court under the Administrative Procedure Act (APA). Accordingly, without any suggestion or motivation found in Yoshitani et al. in view of Thrasher, the Examiner has failed to properly establish a prima facie case of obviousness of the invention as a "whole." The Applicants submit the present invention distinguishes over Yoshitani et al. in view of Thrasher for at least this reason as well.

For the foregoing reasons, independent claims 1 and 15 as amended distinguish over Yoshitani et al. taken alone and/or in view of Thrasher. Claim 10 depends from claim 1 and since dependent claims contain all the limitations of the independent claims, claim 10 distinguishes over Yoshitani et al. in view of Thrasher, as well, and the Examiner's rejection should be withdrawn.

(9) Rejection under 35 U.S.C. § 103(a) Yoshitani in view of Busnaina

As noted above, the Examiner rejected claim 13 under 35 U.S.C. § 103(a) as being unpatentable over Yoshitani et al. (U.S. Patent No. 5,975,098) in view of Busnaina (US2001/0013355).

The Statute expressly requires that obviousness or non-obviousness be determined for the claimed subject matter "as a whole," and the key to proper determination of the differences between the prior art and the present invention is giving full recognition to the invention "as a whole." The Yoshitani et al. reference taken alone or in view of Busnaina simply does not suggest, teach or disclose the patentably distinct limitation of:

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[2] If, however, the Examiner's statements are based on facts within the personal knowledge of the Examiner, the Applicants respectfully request that the Examiner support these references by filing an affidavit as is allowed under MPEP §707 citing 37 CFR 1.104(d)(2).

> ...insonifying the liquid, with a focusing acoustic transducer, as it is being sprayed, producing longitudinal and shear waves which propagate into the object itself with an acoustic power divided by an area (acoustic power/area), which is a function of an amount of electric power applied to the focusing acoustic transducer at a given frequency to result in the liquid with an insonified power density of at least 5 kW / $cm^2$ without substantial cavitation occurring on a surface of an object being cleaned. (emphasis added).

The limitations taken "as a whole" in independent claims 1 and 15 are not present in Yoshitani et al. taken alone and/or in view of Busnaina.

Very recently, the Federal Circuit again took up the identical question of Obviousness in combining references in the case In re Sang Su Lee, No. 00-1158 (January 18, 2002). In this case, the Board of Patent Appeals rejected all of Applicant's pending claims as obvious under § 103. The Federal Circuit vacated and remanded. Citing two prior art references, the Board stated that a person of ordinary skill in the art would have been motivated to combine the references based on "common knowledge" and "common sense," but it did not present any specific source or evidence in the art that would have otherwise suggested the combination. Here the Examiner on page 5 is citing "*it would have been obvious to an artisan at the time the invention was made to clean the articles disclosed by Busnaina by the method of Yoshitani et al. with reasonable expectation of success...*" without more.[3] The Federal Circuit held that the Board's rejection of a need for any specific hint or suggestion in the art to combine the references was both legal error and arbitrary agency action subject to being set aside by the court under the Administrative Procedure Act (APA). Accordingly, without any suggestion or motivation found in Yoshitani et al. in view of Busnaina, the Examiner has failed to properly establish a prima facie case of obviousness of the invention as a "whole." The Applicants submit the present invention distinguishes over Yoshitani et al. in view of Busnaina for at least this reason as well.

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[3] If, however, the Examiner's statements are based on facts within the personal knowledge of the Examiner, the Applicants respectfully request that the Examiner support these references by filing an affidavit as is allowed under MPEP §707 citing 37 CFR 1.104(d)(2).

For the foregoing reasons, independent claim 1, as amended, distinguishes over Yoshitani et al. taken alone and/or in view of Busnaina. Claim 13 depends from claim 1 and since dependent claims contain all the limitations of the independent claims, claim 13 distinguishes over Yoshitani et al. in view of Busnaina, as well, and the Examiner's rejection should be withdrawn.

(10) Rejection under 35 U.S.C. § 103(a) Yoshitani in view of Thrasher et al. and Busnaina

As noted above, the Examiner rejected claim 12 under 35 U.S.C. § 103(a) as being unpatentable over Yoshitani et al. (U.S. Patent No. 5,975,098) in view of Thrasher et al. (U.S. Patent No. 5,745,946), and further in view of Busnaina (US2001/0013355).

The Statute expressly requires that obviousness or non-obviousness be determined for the claimed subject matter "as a whole," and the key to proper determination of the differences between the prior art and the present invention is giving full recognition to the invention "as a whole." The Yoshitani et al. reference taken alone or in view of Thrasher et al., and further in view of Busnaina simply does not suggest, teach or disclose the patentably distinct limitation of:

> ...insonifying the liquid with a focusing acoustic transducer as it is being sprayed, producing longitudinal and shear waves which propagate into the object itself with an acoustic power divided by an area (acoustic power/area), which is a function of an amount of electric power applied to the focusing acoustic transducer at a given frequency to result in the liquid with an insonified power density of at least 5 kW / $cm^2$ without substantial cavitation occurring on a surface of an object being cleaned. (emphasis added).

The limitations taken "as a whole" in independent claims 1 and 15 are not present in Yoshitani et al. taken alone or in view of Thrasher et al., and further in view of Busnaina.

Very recently, the Federal Circuit again took up the identical question of Obviousness in combining references in the case In re Sang Su Lee, No. 00-1158 (January 18, 2002). In this case, the Board of Patent Appeals rejected all of Applicant's pending claims as obvious under § 103. The Federal Circuit vacated and remanded. Citing two prior art references, the Board stated that a person of ordinary skill in the art would have been

motivated to combine the references based on "common knowledge" and "common sense," but it did not present any specific source or evidence in the art that would have otherwise suggested the combination. Here the Examiner on page 5 is citing "*it would have been obvious to artisan at the time the invention was made to clean the articles disclosed by Busnaina by the modified method of Yoshitani et al. with reasonable expectation of success because Busnaina teaches that this article can be cleaned by the same methods as the articles disclosed by Yoshitani et al.*" without more.[4] The Federal Circuit held that the Board's rejection of a need for any specific hint or suggestion in the art to combine the references was both legal error and arbitrary agency action subject to being set aside by the court under the Administrative Procedure Act (APA). Accordingly, without any suggestion or motivation found in Yoshitani et al. taken alone or in view of Thrasher et al., and further in view of Busnaina, the Examiner has failed to properly establish a prima facie case of obviousness of the invention as a "whole." The Applicants submit the present invention distinguishes over Yoshitani et al. taken alone or in view of Thrasher et al., and further in view of Busnaina for at least this reason as well.

It is accordingly believed to be clear that, independent claim 1, as amended, distinguishes over Yoshitani et al. taken alone or in view of Thrasher et al., and further in view of Busnaina. Claim 12 depends from claim 1 and since dependent claims contain all the limitations of the independent claims, claim 12 distinguishes over Yoshitani et al. taken alone or in view of Thrasher et al., and further in view of Busnaina, as well, and the Examiner's rejection should be withdrawn.

For the foregoing reasons, independent claims 1 and 15, as amended, distinguish over Yoshitani et al. taken alone and/or in view of Thrasher et al. and/or Busnaina. Claims 3-13 depend from independent claim 1 and claims 17, and 19-25 depend from independent claim 15. Since dependent claims contain all the limitations of the

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[4] If, however, the Examiner's statements are based on facts within the personal knowledge of the Examiner, the Applicants respectfully request that the Examiner support these references by filing an affidavit as is allowed under MPEP §707 citing 37 CFR 1.104(d)(2).

independent claims, claims 3-13, 17, and 19-25 distinguish over Yoshitani et al., taken alone and/or in view of Thrasher et al. and/or Busnaina, as well, and the Examiner's rejection should be withdrawn.

## CONCLUSION

The remaining cited references have been reviewed and are not believed to affect the patentability of the claims as amended.

In this Response, Applicants have amended certain claims. In light of the Office Action, Applicants believe these amendments serve a useful clarification purpose, and are desirable for clarification purposes, independent of patentability. Accordingly, Applicants respectfully submit that the claim amendments do not limit the range of any permissible equivalents.

Applicants acknowledge the continuing duty of candor and good faith to disclosure of information known to be material to the examination of this application. In accordance with 37 CFR §1.56, all such information is dutifully made of record. The foreseeable equivalents of any territory surrendered by amendment are limited to the territory taught by the information of record. No other territory afforded by the doctrine of equivalents is knowingly surrendered and everything else is unforeseeable at the time of this amendment by the Applicants and their attorneys.

Applicants respectfully submit that all of the grounds for rejection stated in the Examiner's Office Action have been overcome, and that all claims in the application are allowable. No new matter has been added. It is believed that the application is now in condition for allowance, which allowance is respectfully requested.

It is believed that no fee is due with this Amendment. However, if any fees are due, the Commissioner is hereby authorized to charge any fees that may be required or credit any overpayment to Deposit Account 50-0510.

**PLEASE CALL** the undersigned if that would expedite the prosecution of this application.

Respectfully submitted,

Date: June 28, 2004 By: _____

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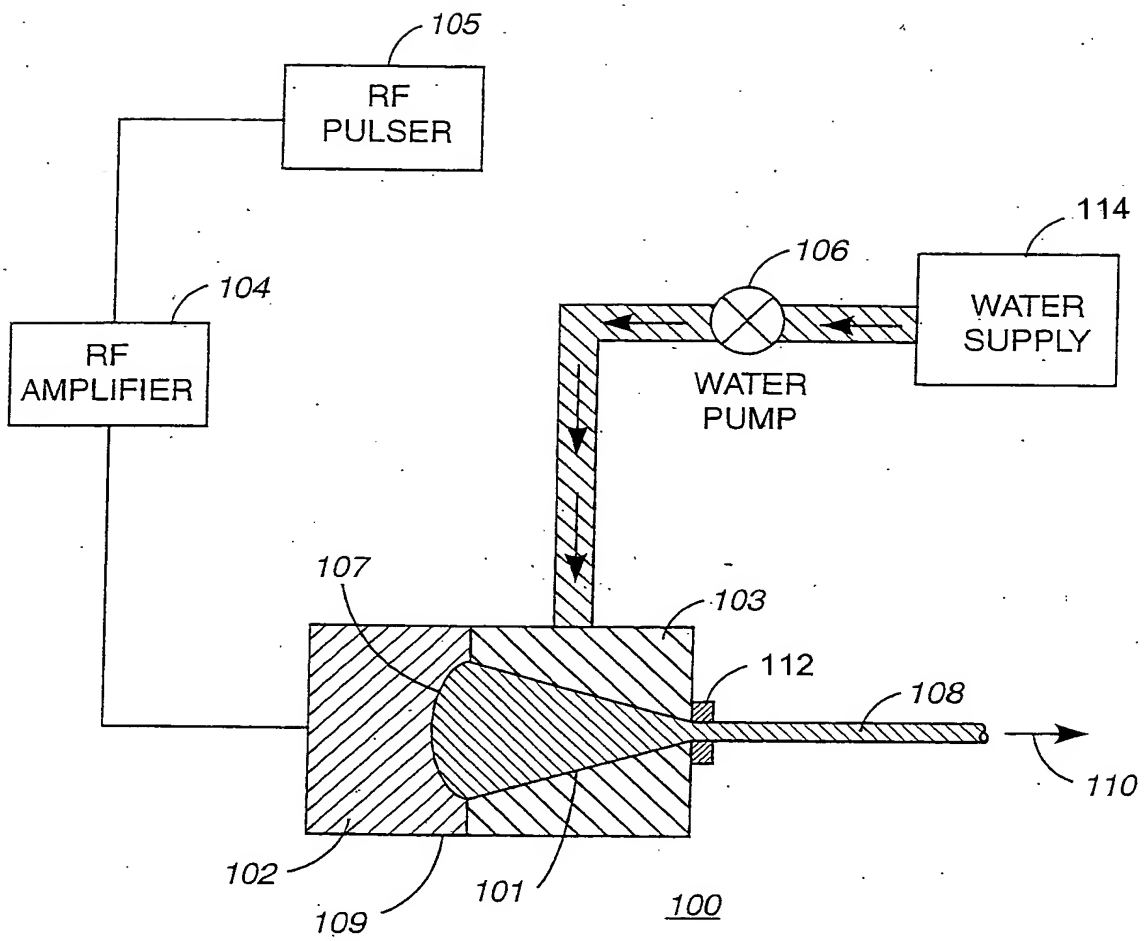


*FIG. 1*